

Maximizing Design Benefit: The 21st Century Project Process



**Board of Directors Meeting
CAD GIS Technology Center
December 9, 2003**

We are Responding

- Just a few months ago the Executive Committee of the Construction Users Roundtable suggested that the Organization pursue the issue of the declining quality of A/E documents
- To address the errors and omissions dilemma, I assembled a team of experts spanning the construction industry

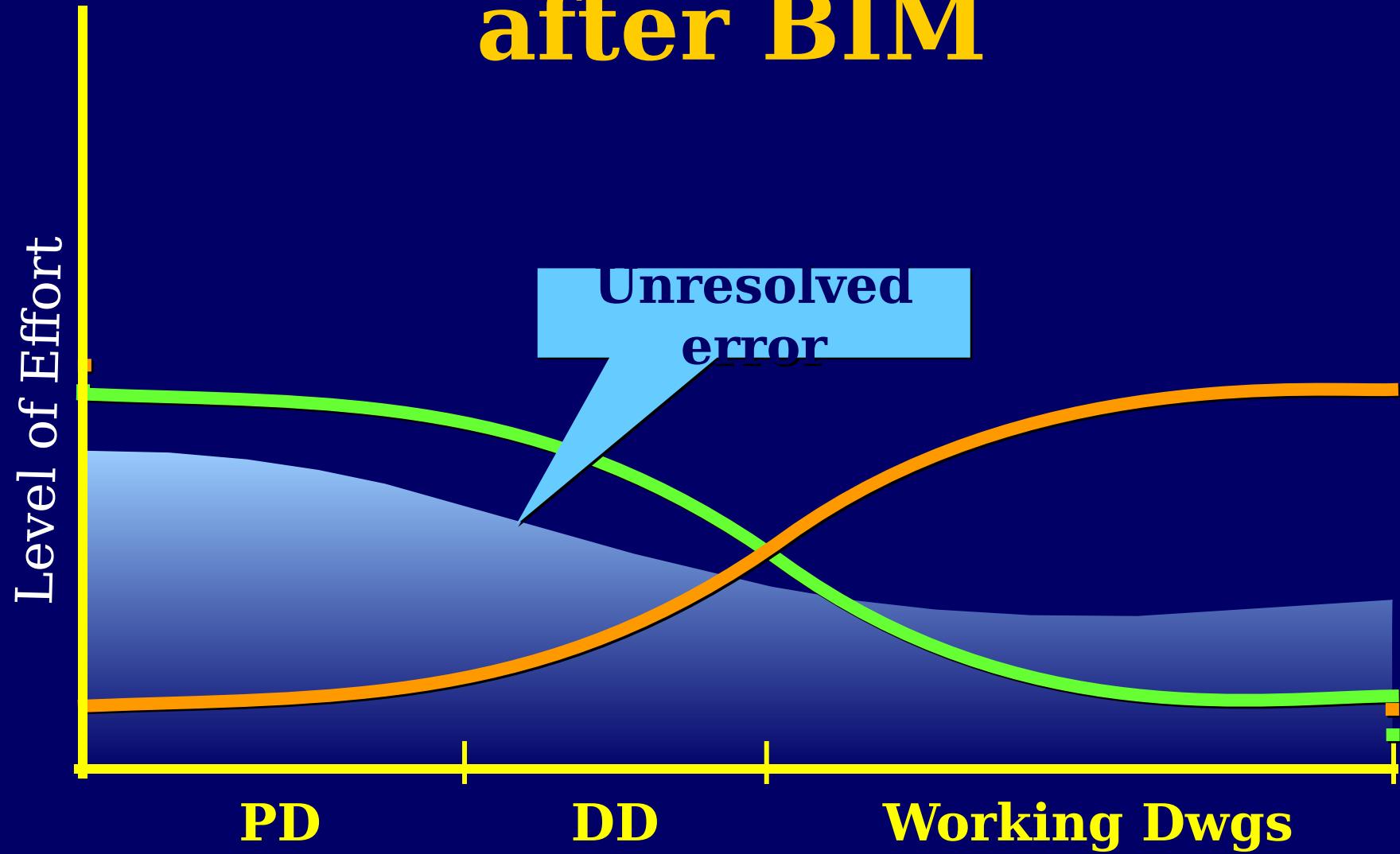
We are Responding

- Executives of professional firms and software vendors, of owner companies and contractors all agreed to assist in mitigating the growing error rate
- We identified that the design process itself posed major problems

We are Responding

- The present design process is considered to be fragmented
- The result is an increase in QFIs, change orders and subsequent major claims
- Claims deplete already strained resources of the Owners

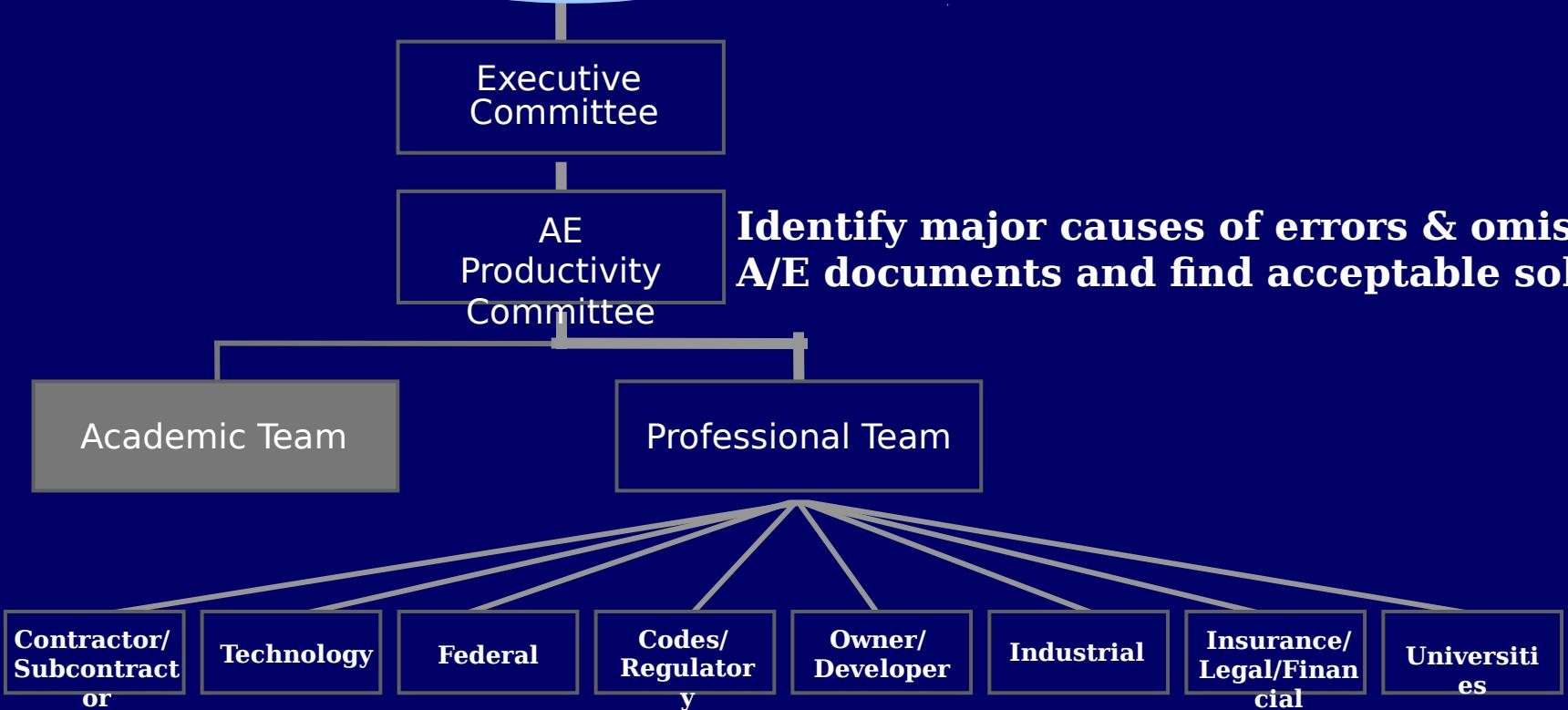
The Design Process Envisioned before and after BIM



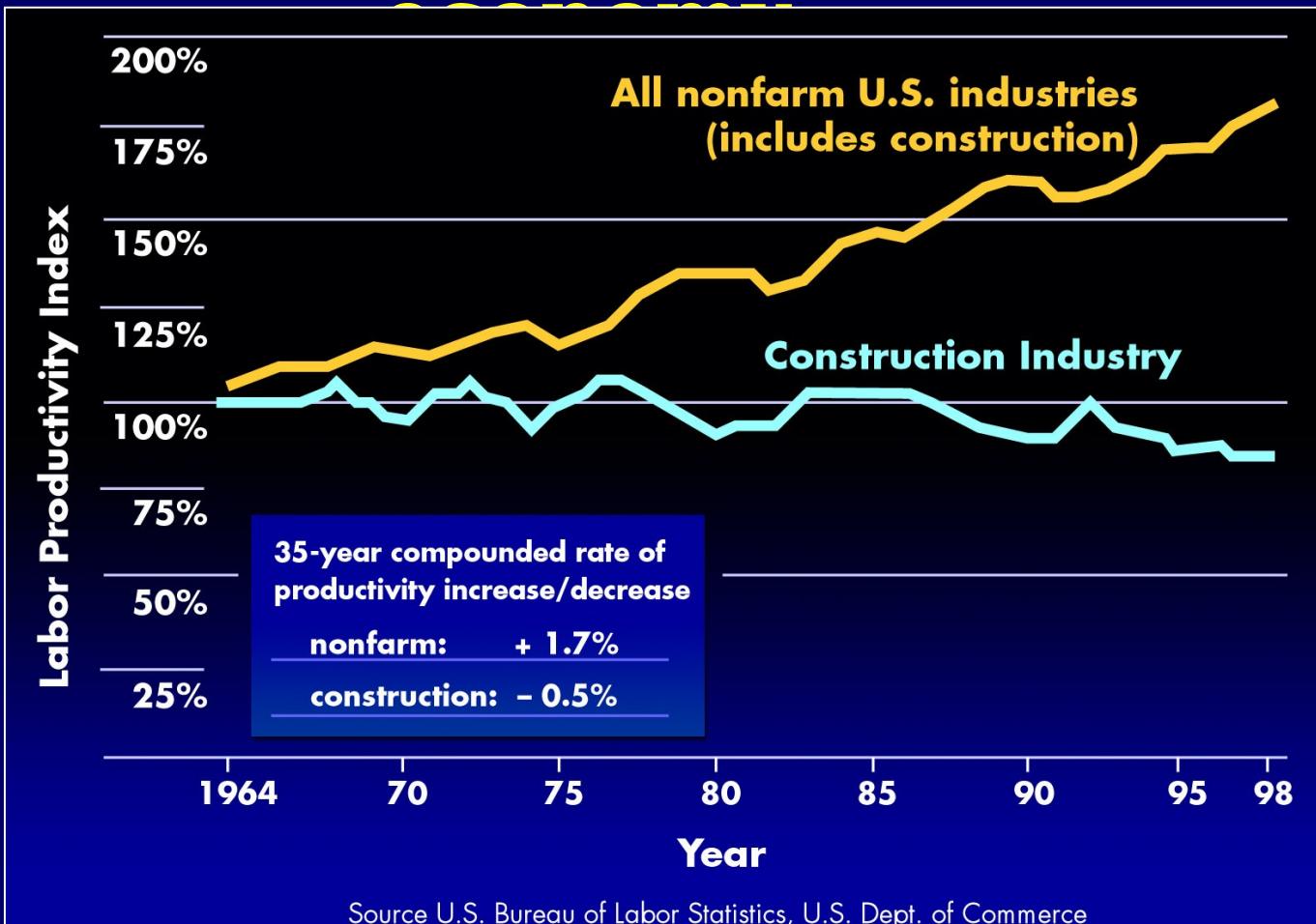
Organizational Structure

Construction Users
Roundtable

Create a strategic advantage for
Construction Users
by focusing on business issues that
promote excellence in Construction

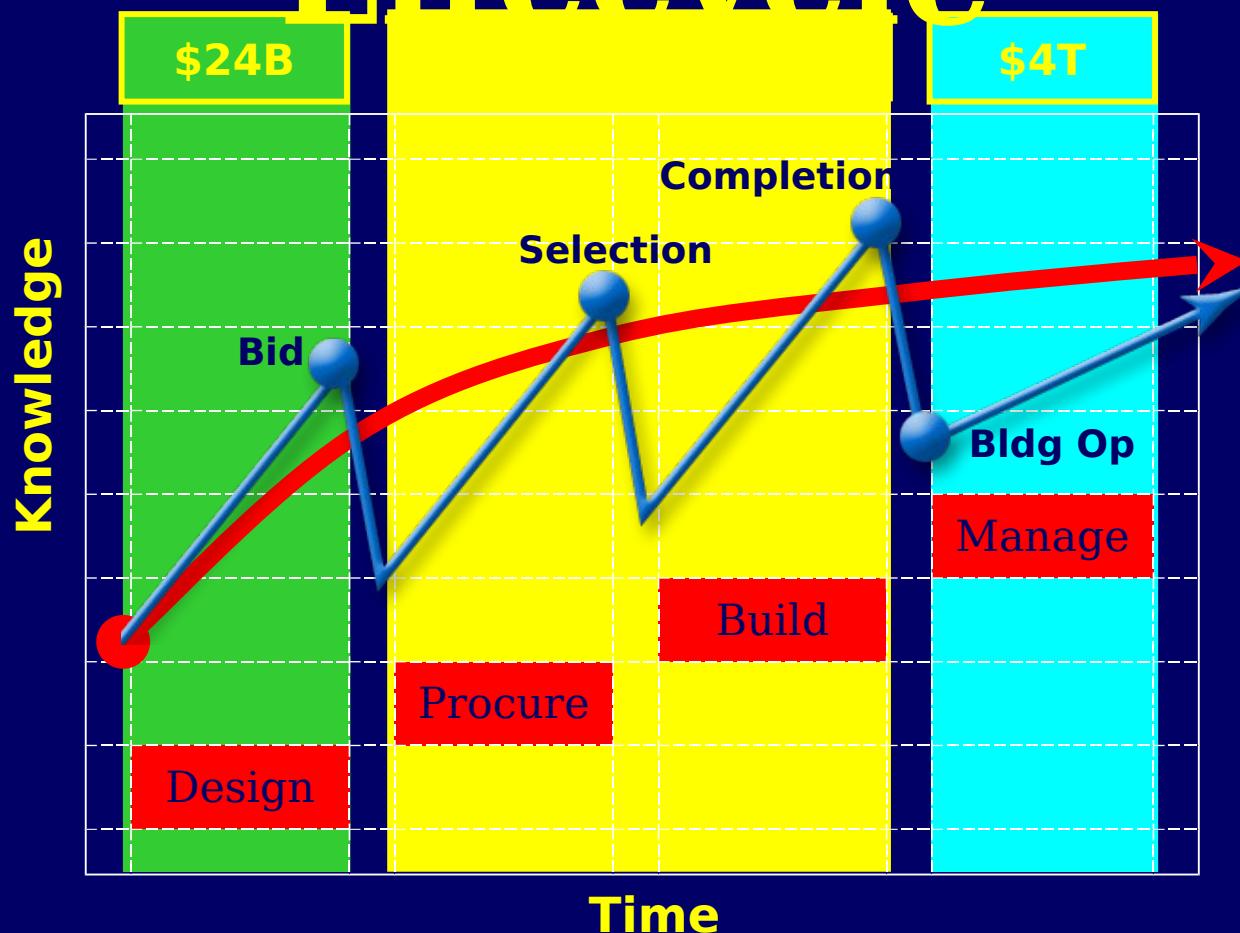


Productivity Gap: Construction lags behind the economy



This is not just “the industry,” this is

Information Flow In The Building Lifecycle



We made a decision

- The team early on made the decision to adopt the Building Information Model (BIM)
- Although the use of the BIM immediately reduces errors, it is much more than that -
- The BIM provides a totally different way of designing
- It is what we all expected from CAD

The Building Information Model

- It is about information use, reuse, and exchange - electronic documents are just a single component of that process
- It is significantly more than transferring electronic versions of paper documents
- It is by achieving a faster, higher-quality, richer design process as the 3-D model-based technology is linked with information

Building Information Model

- Risk is reduced, design intent is maintained, communication is clearer, higher analytical tools are more accessible
- Lower-level tasks such as drafting, view coordination, document generation and schedule creation are automated.
- Drawings are automatically updated when modified

Building Information Model

- This managed environment will become the catalyst for a major change in the construction industry, from A/Es, contractors and owners

Errors and Omissions

- Inefficiencies, mistakes and delays account for \$200 bil of the \$650 bil spent on construction in the US every year
- New wiring, the Economist, January 13, 2000
- In the UK alone, the annual cost of rectifying construction defects caused by poorly detailed drawings and operatives being given incorrect instructions has been put at \$1.5 bil IT Construct.
Best Practice Svc, <http://www.itcbp.org.uk>

Results of Inefficiency

- The process of construction is itself repeated in its essentials from project to project.
Indeed, research suggests that up to 80% of inputs into buildings are repeated.
- M4i, <http://www.m4i.org.uk>

BIM Advantages

- A central database handles simultaneously 3-D model data with plans/section views, dimensions, material finishes and much more
- Make changes anytime - access the right representations of the building for each phase of design and for all the different partners involved in the project
- **Source: Graphisoft**

BIM Advantage

- The Building Information Model is a powerful tool to manage and coordinate all the specialist service discipline data, produces better design solutions and reliable documents faster
- Source: Graphisoft

Interoperability

- **Interoperability has become increasingly more important as we move to more sophisticated systems**
- **Shell reports that quality information reduces costs and improves effectiveness of a facility**
- **In design they estimate that reductions of 10% to 35% of time and cost are achievable**
- **In the US the automobile industry estimated that the industry cost for interoperability is \$1B per annum**

Costs of Interoperability

- The greatest component of cost of interoperability is devoted to repairing and entering data files that are not usable for downstream application
- In the manufacturing industry many different software and hardware systems are being used throughout the supply chain

Cost of Interoperability

- Proprietary data systems are prevalent;
- The cost of interoperability manifests itself in:
 - Avoidance costs
 - Mitigating Costs
 - Delay Costs

The ability to communicate data across different activities is essential to the product and competitiveness of the industry (Brunnermeier and Martin 1999)

We are in the 21st Century

- We shy away from the challenge that will materially change the way the construction industry will do business
- Now we have the opportunity to capture our environment in a 3-D model for future generations.
- It is up to us how we approach this new technology